WHAT IS CLAIMED IS:

1	1. A method for reducing a piston between a plurality of optical-
2	collection devices configured to operate as a single optical device, such that the optical-
3	collection devices are configured to capture select portions of wavefronts, the method
4	comprising:
5	pistoning an adjustable-optical path of at least one of the optical-collection
6	devices through a plurality of steps;
7	collecting a set of focused images and a set of defocused images for each step;
8	Fourier transforming the first and second sets of images to generate respective
9	first and second sets of spectral information for the wavefronts;
10	deriving a set of wavefront errors based on the first and second sets of spectral
11	information using a phase diversity algorithm; and
12	deriving a piston value for the piston from the wavefront errors using a multi-
13	color interferometry algorithm.
1	2. The method of claim 1, wherein each of the wavefront error is
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2	associated with a select wavelength of the wavefronts.
1	3. The method of claim 1, wherein the set of wavefront errors includes at
2	least first and second wavefront errors respectively associated with first and second
3	wavelengths of the wavefronts.
1	4. The method of claim 3, wherein the first and second wavelengths are
2	less than the piston.
1	5. The method of claim 3, wherein the step of deriving the piston value
2	includes:
3	deriving a synthetic wavelength from at least the first and second
4	wavelengths; and
5	counting fringes of an interference pattern to determine the piston
6	value.
1	6. The method of claim 5, wherein the synthetic wavelengths is larger
2	than the first and second wavelengths.

1	7. The method of claim 3, wherein an expression for the synthetic
2	wavelength is: $\Lambda = \lambda_1 \lambda_2 / (\lambda_1 - \lambda_2)$,
3	wherein λ_1 is the first wavelength and λ_2 is the second wavelength.
1	8. The method of claim 1, wherein the optical-collection devices include
2	sub-aperture telescopes forming a portion of a multi-aperture telescope.
1	9. The method of claim 1, wherein the optical-collection devices form a
2	segmented primary collector.
1	10. The method of claim 1, wherein the phase diversity algorithm includes
2	the Gonsalves algorithm.
1	11. The method of claim 1, wherein:
2	collecting the focused images includes generating a first set of
3	interferograms having sample points that correspond to the steps; and
4	collecting the defocused images includes generating a second set of
5	interferograms having sample points that correspond to the steps.
1	12. The method of claim 1, wherein the focused images include focused
2	images of interference patterns.
1	13. The method of claim 1, wherein the defocused images include
2	defocused images of defocused interference patterns.
1	14. The method of claim 1, wherein an amount of focus of the defocused
2	images is known.
1	15. The method of claim 1, wherein collecting the set of focused images
2	and the set of defocused images includes:
3	combining the select portions of the wavefronts to form a combined beam;
4	splitting the combined beam into first and second beams with a beam splitter;
5	collecting the first beam at an image plane on a first image-capture array; and
6	collecting the second beam a distance from the image plane on a second
7	image-capture array.

1	16. The method of claim 15, wherein the first and second image-capture
2	arrays are a single image-capture array.
1	17. The method of claim 1, further comprising reducing the piston of the
2	optical-collection devices based on the piston value.
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1	18. A method for reducing a displacement between a plurality of optical-
2	collection devices configured to operate as a single optical device, such that the optical-
3	collection devices are configured to capture select portions of wavefronts, the method
4	comprising:
5	pistoning an adjustable-optical path of at least one of the optical-collection
6	devices through a plurality of steps;
7	collecting a set of focused images and a set of defocused images for each of
8	the steps;
9	Fourier transforming the first and second sets of images to derive respective
10	first and second sets of spectral information for the wavefronts;
11	generating a plurality of visible indicators of the displacement from the first
12	and second sets of spectral information using a metric; and
13	interpreting the visible indicators to determine a value for the displacement,
14	the value for the displacement referred to as a displacement value.
1	19. The method of claim 18, further comprising calculating the metric for a
2	wavelength value associated with each of the steps.
1	20. The method of claim 18, wherein a value for the displacement is
2	indicated by a uniform-visible indicator.
1	21. The method of claim 20, further comprising performing pattern
2	recognition on the visible indictors to determine the uniform-visible indicator.
. 1	22. The method of claim 18, wherein the metric is a power metric.
1	23. The method of claim 22, wherein the power metric is represented by
2	the equation $Mp = (G_0*G_0 - G_d*G_d)/(G_0*G_0 + G_d*G_d)$, wherein G_0 is a Fourier transform of
3	an image function for the focused images and G _d is a Fourier transform of an image function

for the defocused images.

1	24. The method of claim 23, wherein an image function is the convolution
2	of the object function and optical system point spread function.
1	25. A multi-aperture telescope comprising:
2	a plurality of sub-aperture telescopes, wherein at least one of the sub-aperture
3	telescopes has an adjustable-optical path;
4	a Fourier transform module configured to transform focused and defocused
5	image information collected by the sub-aperture telescopes and to generate spectral
6	information from the focused and defocused image information;
7	a phase diversity module configured to derive wavefront errors from the
8	focused and defocused image information; wherein the wavefront errors are associated with
9	select wavelengths collected by the sub-aperture telescopes; and
10	a multi-color interferometry module configured to derive a displacement value
11	indicative of a displacement between at least first and second sub-aperture telescopes of the
12	plurality of sub-aperture telescopes.